Biology
Curriculum Mapping
2019-2020
Mark Joachim

<table>
<tr><td colspan="2">Unit: Intro to Biology</td><td>Time: August 2019</td></tr>
<tr><td colspan="3">Standards Taught</td></tr>
<tr><td colspan="3">HS-LS1-3 Plan and carry out an investigation to provide evidence that feedback mechanisms maintain homeostasis.
Identify scientific methods, and how Biology takes measurements and studies organisms with qualitative and quantitative data.
Summarize the characteristics of living things.
Explain why science and technology cannot solve all problems.</td></tr>
<tr><td>Differentiation/Assessment:</td><td>Classroom Management and Environment:</td><td>What will the students be doing?</td></tr>
<tr><td>Students who needed the extra help received guided notes, extra individual practice, modified questions and shortened tests.</td><td>The classroom is set up using student tables, with 2 students per table. The students move into different groups for labs and group projects.</td><td>The students will be identify the characteristics of life, recognize how scientific methods are used to study living things.</td></tr>
<tr><td>Prior Knowledge Needed</td><td>Vocabulary</td><td>Assessments</td></tr>
<tr><td>Students have a foundation in science that they will draw upon in this course.</td><td>Scientific methods, organization, quantitative and qualitative information.</td><td>Students will answer questions in class, participate in discussions, daily assignments, group work, labs, and take chapter tests.</td></tr>
<tr><td>Reflection:
This chapter is a review of science concepts from previous courses.</td><td colspan="2">Essential Questions:
What is Biology?
What are scientific methods?
How are quantitative data and qualitative data different?
Why is the metric system important in science?</td></tr>
<tr><td>Relevance:</td><td colspan="2">Most of these concepts are a review from previous science courses.</td></tr>
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<table>
<tr><td colspan="2">Unit: Ecology</td><td>Time: September - October 2019</td></tr>
<tr><td colspan="3">Standards Taught</td></tr>
<tr><td colspan="3">• HS-LS2-1, HS-LS2-2, HS-LS2-3, HS-LS2-4, H HS-LS2-5, HS-LS2-6, HS-LS2-7, HS-LS2-8</td></tr>
<tr><td>Differentiation/Assessment:</td><td>Classroom Management and Environment:</td><td>What will the students be doing?</td></tr>
<tr><td>Students who needed the extra help received guided notes, extra individual practice, modified questions and shortened tests.</td><td>The classroom is set up using student tables, with 2 students per table. The students move into different groups for labs and group projects.</td><td>~The students will trace the flow of energy and nutrients in living and nonliving worlds.
~Identify important aspects of an organism's environment and interactions between organisms.</td></tr>
<tr><td>Prior Knowledge Needed</td><td>Vocabulary</td><td>Assessments</td></tr>
<tr><td>Students have a foundation in science that they will draw upon in this course.</td><td>biotic factor, abiotic factor, niche, ecology, population, biological community, ecosystem, habitat, symbiosis, mutualism, parasitism, commensalism, autotroph, heterotroph, food chain, food web, biomass, trophic levels, biodiversity, biomes, primary and secondary succession, exponential growth, linear population growth, limiting factors, carrying capacity, density-dependent factors, life-history pattern, demography, edge effect, exotic species, habitat degradation, habitat fragmentation, endangered species, habitat corridors, reintroduction programs, Captivity, sustainable use,</td><td>Students will answer questions in class, participate in discussions, daily assignments, group work, labs, and take chapter tests.</td></tr>
<tr><td>Reflection:
This unit allows the student to look at the world that they live in, and begin to understand how and why the different species interact and fit into it.</td><td colspan="2">Essential Questions:
• What is ecology?
• How is energy transferred from organism to organism through the trophic levels?
• How do organisms relate to the biotic and abiotic factors in their ecosystem?
• Why are big fierce animals rare?
• How do environmental factors affect population growth?
• Why do certain species only live in certain areas?
• What effect do exotic species have on native species?</td></tr>
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	• *Why is biodiversity important to the environment?* • *How do reintroduction programs work, and how successful are they?* •
Relevance:	*This unit shows how organisms are diverse, dependent on each other and their environment for survival.*

Unit: ***Life of a Cell***		**Time:** *November 2019*
Standards Taught		
• *HS-LS1-1, HS-LS1-2, HS-LS1-3, HS-LS1-4, HS-LS1-6, HS-LS1-7*		
Differentiation/Assessment:	**Classroom Management and Environment:**	**What will the students be doing?**
Students who needed the extra help received guided notes, extra individual practice, modified questions and shortened tests.	*The classroom is set up using student tables, with 2 students per table. The students move into different groups for labs and group projects.*	*~The students will be comparing the role of biomolecules in organisms.* *~The students will identify how the process of diffusion and osmosis occurs and why they are important to cells.*
Prior Knowledge Needed	**Vocabulary**	**Assessments**
Students have a foundation in science that they will draw upon in this course.	*Atom, electron, proton, neutron, element, nucleus, isotopes, compound, covalent bond, ionic bond, ion, metabolism, polar molecule, pH, acid, base, dynamic equilibrium, diffusion, concentration gradient, diffusion, osmosis, isomer, peptide bond, polymer, nucleotide, fluid mosaic model, phospholipid, chromatin, transport proteins, selective permeability plasma membrane, active transport, endocytosis, exocytosis, facilitated diffusion, hypertonic solution, hypotonic solution, isotonic solution, mitosis, meiosis, passive transport, cancer, gene*	*Students will answer questions in class, participate in discussions, daily assignments, group work, labs, and take chapter tests.*

	ATP – Adenosine triphosphate, ADP – Adenosine Diphosphate, Calvin cycle, electron transport chain, NADP+, photolysis, light independent reactions, light dependent reactions, glycolysis, aerobic, anaerobic, lactic acid fermentation, alcoholic fermentation, citric acid cycle	
Reflection: *Students built upon their knowledge of chemistry and the interactions that take place within an organism.*	**Essential Questions:** • *How are elements, and trace elements important in your body?* • *Why is osmosis an important function within the body and interacting cells.* • *What are amino acids called the building blocks of protein?* • *How are peptide bonds necessary?* • *How are eukaryotes different from prokaryotes?* • *How do molecules enter a cell and how do cells divide?* • *What does ATP (energy) do for the cell and for the organism?* • *Why is the plasma membrane key in the function of the cell, and in all of the organ systems?* • *What may cause a cell cycle to be disrupted and grow out of control?* • *What determines the size of a cell and its metabolism?* • *What is the relationship between ADP and ATP as energy is made and released for the cell?* • *How is energy released when oxygen is, and is not available?*	
Relevance	The students will expand their knowledge and understanding of how chemicals in the body react, relate, and work together in organ systems to make the organism function properly.	

Unit: ***Genetics***	**Time:** *December 2019*	
Standards Taught		
• *HS-LS3-1*, *HS-LS3-2*, *HS-LS3-3*, • *HS-LS4-1*, *HS-LS4-3*, *HS-LS4-4*, *HS-LS4-7*		
Differentiation/Assessment:	**Classroom Management and Environment:**	**What will the students be doing?**
Students who needed the extra help received guided notes, extra individual practice, modified questions and shortened tests.	*The classroom is set up using student tables, with 2 students per table. The students move into different groups for labs and group projects.*	*The students will identify basic concepts of genetics.* *The students will examine the process of meiosis.* *They will analyze how meiosis maintains a constant number of chromosomes within a species.* *Infer how meiosis leads to variation in a species.* *Relate Mendel's law of heredity to the events of meiosis.* *Interpret a pedigree* *Explain the patterns of multiple allelic and polygenic inheritance.* *Relate the structure of DNA to it function.* *Explain the role of DNA in protein production.* *Determine the inheritance of sex-linked traits.* *Summarize the steps used to engineer transgenic organisms.* *Evaluate the importance of plant and animal breeding to humans.*
Prior Knowledge Needed	**Vocabulary**	**Assessments**
Students have a foundation in science that they will draw upon in this course.	*Allele, dominant, fertilization, gamete, genetics, genotype, heredity, heterozygous, homozygous, hybrid, purebred, law of independent assortment, law of segregation, phenotype,*	*Students will answer questions in class, participate in discussions, daily assignments, group work, labs, and take chapter tests.*

	zygote, chromosomal mutation, frameshift mutation, recessive, crossing over, diploid, genetic recombination, haploid, homologous chromosome, nondisjunction, pedigree, DNA replication, double helix, nitrogenous base, codon, messenger RNA, ribosomal RNA, transcription, transfer RNA, translation, mutagen, mutation, point mutation, carrier, fetus, Autosome, codominant allele, multiple allele, incomplete dominance, polygenic inheritance, sex chromosome, sex-linked trait, karyotype, Inbreeding, test cross, genetic engineering, plasmid, restriction enzyme, transgenic organism, vector, gene therapy, human genome, linkage map	
Reflection: *Students*	**Essential Questions:** • *Why do we have the same parents, but at the same time be so different from each other?* • *How can genetic engineering be used for positive gain?* • *How can DNA fingerprinting identify individuals?* • *How are purebreds and hybrids developed in plants and animals?*	
Relevance	The students will understand why there are differences and similarities, among them and their siblings, as well as other organisms.	

<table>
<tr><td colspan="2">Unit: Change Through and Over Time</td><td>Time: January 2020</td></tr>
<tr><td colspan="3">Standards Taught</td></tr>
<tr><td colspan="3">• HS-LS4-1, HS-LS4-2, HS-LS4-4, HS-LS4-5, HS-LS4-7</td></tr>
<tr><td>Differentiation/Assessment:</td><td>Classroom Management and Environment:</td><td>What will the students be doing?</td></tr>
<tr><td>Students who needed the extra help received guided notes, extra individual practice, modified questions and shortened tests.</td><td>The classroom is set up using student tables, with 2 students per table. The students move into different groups for labs and group projects.</td><td>The students will be correlate geologic time with biological events.
Provide evidence how rocks and fossils provide evidence of changes in Earth's organisms.
Analyze the theory of evolution, comparing and contrasting the processes of evolution.
Analyze the evidence for the ancestry of humans.</td></tr>
<tr><td>Prior Knowledge Needed</td><td>Vocabulary</td><td>Assessments</td></tr>
<tr><td>Students have a foundation in science that they will draw upon in this course.</td><td>archaebacteria, biogenesis, spontaneous generation, gradualism, analogous structure, vestigial structure, speciation, homologous structure, convergent evolution, geographic isolation, genetic equilibrium, directional selection, disruptive selection, punctuated equilibrium, gene pool, reproductive isolation, phylogeny, cladogram, cladistics, classification, binomial nomenclature</td><td>Students will answer questions in class, participate in discussions, daily assignments, group work, labs, and take chapter tests.</td></tr>
<tr><td>Reflection:
Students had strong opinions and questions about evolution and change.</td><td colspan="2">Essential Questions:
• What evidence is there in reference to evolutionary changes?
• How closely are organisms designed and related?
• What can cause the different species to developed?</td></tr>
<tr><td>Relevance</td><td colspan="2">Students need to know history, and how changes over time may allow for variances in different species.</td></tr>
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<table>
<tr><td colspan="2">Unit: Viruses, Bacteria, Protists and Fungi</td><td>Time: January - February 2020</td></tr>
<tr><td colspan="3">Standards Taught</td></tr>
<tr><td colspan="3">HS-LS1-4,
HS-LS2-3 HS-LS2-6, HS-LS2-7,</td></tr>
<tr><td>Differentiation/Assessment:</td><td>Classroom Management and Environment:</td><td>What will the students be doing?</td></tr>
<tr><td>Students who needed the extra help received guided notes, extra individual practice, modified questions and shortened tests.</td><td>The classroom is set up using student tables, with 2 students per table. The students move into different groups for labs and group projects.</td><td>The students will identify the structures and characteristics of viruses and bacteria.
Explain how they reproduce.
Recognize medical and economic importance of viruses and bacteria.
Identify human diseases and protists responsible.
Identify and understand the importance of fungi.</td></tr>
<tr><td>Prior Knowledge Needed</td><td>Vocabulary</td><td>Assessments</td></tr>
<tr><td>Students have a foundation in science that they will draw upon in this course.</td><td>Ciliate, flagellate, sporozoan, Asexual reproduction, fragmentation, plasmodium, sporophyte, Bacteriophage, lysogenic cycle, lytic cycle, prion, provirus, retrovirus, virus, viroid, chemosynthesis, obligate aerobe and anaerobe, toxin, endospore</td><td>Students will answer questions in class, participate in discussions, daily assignments, group work, labs, and take chapter tests.</td></tr>
<tr><td>Reflection:
Students had many questions about viruses and Corona.</td><td colspan="2">Essential Questions:
How do viruses replicate if not considered alive?
What makes viruses and bacteria hard to kill, destroy?</td></tr>
<tr><td>Relevance</td><td colspan="2">Every person is affected by viruses or bacteria, and know how they can affect their health is a benefit.</td></tr>
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Unit: *Plants*	**Time:** *February - March 2020*	
Standards Taught		
• *HS-LS1- HS-LS1-1, HS-LS1-2, HS-LS1-3, HS-LS1-4, HS-LS1-5, HS-LS1-6, HS-LS1-7* • *HS-LS2-4, HS-LS2-5, HS-LS2-6* • *HS-LS3-1, HS-LS3-2, HS-LS3-3* • HS-LS4-5		
Differentiation/Assessment:	**Classroom Management and Environment:**	**What will the students be doing?**
Students who needed the extra help received guided notes, extra individual practice, modified questions and shortened tests.	*The classroom is set up using student tables, with 2 students per table. The students move into different groups for labs and group projects.*	*The students will Identify and evaluate adaptations of plants to land.* *Survey and Identify the major divisions of plants.* *Identify distinguishing feature of vascular/ nonvascular plants.* *Analyze the advantages of seed production.* *Describe and compare major types of plant cells and tissues.* *ID and analyze structure and functions of roots stems and leaves.* *Determine the nature of plant responses.* *Compare and contrast reproduction and life cycles.*
Prior Knowledge Needed	**Vocabulary**	**Assessments**
Students have a foundation in science that they will draw upon in this course.	*Apical meristem, collenchyma, cork cambium, epidermis, guard cell, meristem, parenchyma, phloem xylem, sclerenchyma, sieve tube member, stomata, vascular cambrium, vessel element, endodermis, pericycle, root cap, sink, translocation, transpiration, auxin, cytokinin, ethylene, gibberellin, hormone, nastic movement, tropism, archegonium, antheridium, prothallus, sorus, strobilis, annuals, biennials, perennials, deciduous plant, cotyledon, monocotyledon, ovule, pollen*	*Students will answer questions in class, participate in discussions, daily assignments, group work, labs, and take chapter tests.*

	grain, cone, frond, vascular tissue, vascular and nonvascular plant, cuticle, day-neutral, long-day, short-day, anther, pistil ovary, petals, pistil, sepals, stamen, dormancy, vegetative reproduction, photoperiodism,	
Reflection: *Students enjoyed identifying the plants and plant parts.*	**Essential Questions:** • *Why do plants produce pollen and flowers?* • *How does water move up a plant to the leaves?* • *How do plants grow in hard soil or rocks?* • *What would life for animals be like if there were no plants?*	
Relevance	In a farming and rural community, knowing more about the plants and how they are important, including gardening.	

<table>
<tr><td colspan="2">Unit: Invertebrates.</td><td>Time: March 2020</td></tr>
<tr><td colspan="3">Standards Taught</td></tr>
<tr><td colspan="3">HS-LS1-1, HS-LS1-2, HS-LS1-3, HS-LS1-4, HS-LS1-6, HS-LS1-7
HS-LS2-4, HS-LS2-7HS-LS2-8</td></tr>
<tr><td>Differentiation/Assessment:</td><td>Classroom Management and Environment:</td><td>What will the students be doing?</td></tr>
<tr><td>Students who needed the extra help received guided notes, extra individual practice, modified questions and shortened tests.</td><td>The classroom is set up using student tables, with 2 students per table. The students move into different groups for labs and group projects.</td><td>The students will identify animal characteristics and distinguish between organisms.
Identify cell differentiation in the developmental stages.
ID & interpret body plans.
Distinguish among the different classes of animals.
Explain why arthropods are the most abundant.
Dissection of an earthworm.</td></tr>
<tr><td>Prior Knowledge Needed</td><td>Vocabulary</td><td>Assessments</td></tr>
<tr><td>Students have a foundation in science that they will draw upon in this course.</td><td>Pharyngeal pouch, notochord, dorsal hollow nerve cord, tube foot, ray, water vascular system, appendage, book lung, cephalothorax, mandible, molting, pheromone, spiracle, tracheal tube, metamorphosis, nymph, pupa, larva, spinneret, parthenogenesis, closed circulatory system, open circulatory system, radula, nephridia, mantle, gizzard, setae, hermaphrodite, internal/external feritization, pharynx, regeneration, trichinosis, scolex, nematocyst Mesoderm, endoderm, ectoderm, gastrula, blastula, acoelomate, pseudocoelom, symmetry, ventral, dorsal, radial</td><td>Students will answer questions in class, participate in discussions, daily assignments, group work, labs, and take chapter tests.</td></tr>
<tr><td>Reflection:
Students did well and enjoyed the differences, and dissecting.</td><td colspan="2">Essential Questions:
Why do invertebrates have different body plans?
How do the invertebrates have similar and different structures compared to humans?</td></tr>
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Relevance	Invertebrates are a food source for many animals as well as humans and what would it be like without knowing anything about them?

Unit: *Vertebrates.*	**Time:** *April-May 2020*	
Standards Taught		
• *HS-LS1-1*, *HS-LS1-2*, *HS-LS1-3*, *HS-LS1-4*, *HS-LS1-6*, *HS-LS1-7* • *HS-LS2-4*, *HS-LS2-7HS-LS2-8*		
Differentiation/Assessment:	**Classroom Management and Environment:**	**What will the students be doing?**
Students who needed the extra help received guided notes, extra individual practice, modified questions and shortened tests.	*The classroom is set up using student tables, with 2 students per table. The students move into different groups for labs and group projects.*	*The students will identify animal characteristics and distinguish between organisms.* *Distinguish among the different classes of animals.* *Dissection of Frog and fetal pig.*
Prior Knowledge Needed	**Vocabulary**	**Assessments**
Students have a foundation in science that they will draw upon in this course.	*Cartilage, fin, lateral line system, scale, spawning, swim bladder, ectotherm, vocal cord, amniotic egg, Jacobson's organ, endotherm, feather, incubate, sternum, diaphragm, gland, mammary gland, gestation, marsupial, monotreme, placenta, placental mammal, therapsid, uterus, behavior, estivation, hibernation, instinct, imprinting, conditioning*	*Students will answer questions in class, participate in discussions, daily assignments, group work, labs, and take chapter tests.*
Reflection: *Students did well and enjoyed the differences, and dissecting.*	**Essential Questions:** • *How is an endoskeleton an advantage for vertebrates?* • *How do the vertebrates have similar and different structures compared to humans?*	
Relevance	Vertebrates are a food source for many animals as well as humans and what would it be like without knowing anything about their diversity?	